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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.: G40-C082
Plant ID No.: 045-00149
Applicant: Greenbrier Minerals, LLC
Facility Name: Toney Fork Surface Mine
Location: Lorado, Logan County, WV
SIC Code: 1221 (Bituminous Coal and Lignite - Surface)
NAICS Code: 212111 (Bituminous Coal and Lignite Surface Mining)
Application Type: Construction
Received Date: November 3, 2016
Engineer Assigned: Dan Roberts
Fee Amount: \$1,500
Date Received: November 4, 2016
Applicant's Ad Date: November 4, 2016
Newspaper: *Logan Banner*
Complete Date: December 27, 2016
UTM Coordinates: Easting: 435.91631 km Northing: 4185.32310 km NAD83 Zone 17N
Lat/Lon Coordinates: Latitude: 38.028131 Longitude: -81.252131 NAD83
Description: Construction of a Powerscreen Premiertrak 400 Jaw Crusher rock crushing and screening plant powered by a Caterpillar C9 ACERT 194kW (260 hp) engine E1 manufactured in 2015. Engine E1 is EU Stage IIIA / US Tier 3 certified. This 400 TPH and 640,000 TPY rock crushing and screening plant will be used to produce sized rock for drainage ditches and road repair.

BACKGROUND

Greenbrier Minerals, LLC has proposed to construct and operate a rock crushing and screening plant at their Toney Fork Surface Mine under pending general permit application G40-C082. Greenbrier Minerals, LLC is the owner and operator of the proposed site and is a subsidiary corporation of Coronado Coal, LLC.

Greenbrier Minerals, LLC has current General Permit registrations G10-D164 approved on October 12, 2016 for a raw coal crushing plant and G60-C079 approved on March 3, 2017 for an emergency generator located near the proposed site of the rock crushing and screening plant (G40-C082). The proposed rock crushing and screening plant, existing emergency generator and existing raw coal crushing plant will share a common facility ID number of 045-00149 since they are located on the same property.

Greenbrier Minerals, LLC's proposed rock crushing and screening plant (G40-C082), emergency generator (G60-C079) and existing raw coal crushing plant (G10-D164) meet the definition of "Building, Structure, Facility, or Installation" in 45CSR14.2.10 and "Major Source" in 45CSR30.2.26 and shall be considered as one facility for determining applicability to 45CSR14 (PSD) and 45CSR30 (Title V). Therefore, Greenbrier Minerals, LLC's proposed construction and their existing operations shall be combined when determining applicability.

DESCRIPTION OF PROCESS

The Toney Fork Surface Mine rock crushing and screening facility will be located in a remote area of the Toney Fork Surface Mine near Pardee/Saunders, Logan County, WV.

This system will be used to crush and screen rock for drainage ditches and road repair.

Material from the overburden area will be fed by front-end loader to a 15 ton bin BS-01(PW) @ TP-01(UD-PW); transfer to belt conveyor BC-01(NC) @ TP-02(TC-PE); to a fully enclosed crusher CR-01(FE) @ TP-03(TC-FE); to screen feed conveyor BC-02(NC) @ TP-04(TC-FW); and to the screen SS-01(PW) @ TP-05(TC-PW). The screen will discharge depending on size to the three transfer conveyors BC-03(NC), BC-04(NC) and BC-05 @ TP-06(TC-FE), TP-09(TC-FE) and TP-12(TC-FE) for discharge into three separate open stockpiles OS-01(SW-WS), OS-02(SW-WS) and OS-03(SW-WS). The stockpiled material will be transferred to truck by front-end loader for distribution.

The fuel tank holds 108 gallons sufficient for a 12 hour shift which equals use of 9 gallons per hour. Our calculations are based on this fuel usage.

The facility shall be constructed and operated in accordance with the following equipment and control device information taken from registration application G40-C082 and any amendments thereto:

Equipment ID No.	Date of Construction, Reconstruction or Modification ¹	G40-C Applicable Sections ²	Emission Unit Description	Maximum Permitted Throughput		Control Equipment ³	Associated Transfer Points		
				TPH	TPY		Location: B -Before A -After	ID No.	Control Equipment ³
BS-01	C 2015	5 and 8	Front-end Loader Dump Bin - 15 tons capacity - receives material from the overburden area via a front-end loader and feeds in onto BC-01	400	640,000	PW	B A	TP-01 TP-02	UD-PW TC-PE
BC-01	C 2015	5 and 8	Belt Conveyor - receives raw material from BS-01 and transfers it to CR-01	400	640,000	NC	B A	TP-02 TP-03	TC-PE TC-FE

Equipment ID No.	Date of Construction, Reconstruction or Modification ¹	G40-C Applicable Sections ²	Emission Unit Description	Throughput		Control Equipment ³	Associated Transfer Points		
				TPH	TPY		Location: B -Before A -After	ID No.	Control Equipment ³
CR-01	C 2015	5 and 8	Jaw Crusher - receives raw material from BC-01, crushes it from/to 4" x 0 and then drops it onto BC-02	400	640,000	FE	B A	TP-03 TP-04	TC-FE TC-FW
BC-02	C 2015	5 and 8	Belt Conveyor - receives crushed material from CR-01 and transfers it to SS-01	400	640,000	NC	B A	TP-04 TP-05	TC-FW TC-PW
SS-01	C 2015	5 and 8	Double Deck Screen - receives crushed rock from BC-02, classifies it and 3" rock drops onto BC-03, 2" rock drops onto BC-04 and <2" rock drops onto BC-05	400	640,000	PW	B A A A	TP-05 TP-06 TP-09 TP-12	TC-PW TC-FE TC-FE TC-FE
BC-03	C 2015	5 and 8	Belt Conveyor - receives 3" sized rock from SS-01 and transfers it onto OS-01	400	640,000	NC	B A	TP-06 TP-07	TC-FE TC-MDH
OS-01	C 2015	5 and 8	3" Sized Rock Open Stockpile - maximum 2,000 tons capacity, 3,869 ft ² base area, and 20' height - receives 3" sized rock from BC-03, stores it and then a front-end loader reclaims it and loads it to trucks	400	640,000	WS	B A	TP-07 TP-08	TC-MDH LO-MDH
BC-04	C 2015	5 and 8	Belt Conveyor - receives 2" sized rock from SS-01 and transfers it onto OS-02	400	640,000	NC	B A	TP-09 TP-10	TC-FE TC-MDH
OS-02	C 2015	5 and 8	2" Sized Rock Open Stockpile - maximum 2,000 tons capacity, 3,869 ft ² base area, and 20' height - receives 2" sized rock from BC-04, stores it and then a front-end loader reclaims it and loads it to trucks	400	640,000	WS	B A	TP-10 TP-11	TC-MDH LO-MDH
BC-05	C 2015	5 and 8	Belt Conveyor - receives <2" sized rock from SS-01 and transfers it onto OS-03	400	640,000	NC	B A	TP-12 TP-13	TC-FE TC-MDH
OS-03	C 2015	5 and 8	<2" Sized Rock Open Stockpile - maximum 2,000 tons capacity, 3,869 ft ² base area, and 20' height - receives 2" sized rock from BC-05, stores it and then a front-end loader reclaims it and loads it to trucks	400	640,000	WS	B A	TP-13 TP-14	TC-MDH LO-MDH

¹ In accordance with 40 CFR 60 Subpart OOO, for affected facilities constructed, re-constructed or modified after April 22, 2008, visible emissions from any screen, transfer point on a belt conveyor, storage bin or from any other affected facility shall not exceed seven percent (7%) opacity and any crusher shall not exceed twelve percent (12%) opacity.

² All registered affected facilities under Class II General Permit G40-C are subject to Sections 1.0, 1.1, 2.0, 3.0 and 4.0.

³ Control Device Abbreviations: FE - Full Enclosure; FW - Full Enclosure with Water Sprays; PE - Partial Enclosure; PW - Partial Enclosure with Water Sprays; WS - Water Sprays; TC - Telescopic Chute; UC - Under-pile Conveyor; MDH - Minimize Drop Height; and NC - No Control.

Reciprocating Internal Combustion Engines

Emission Unit ID No.	Emission Unit Description (Make, Model, Serial No., etc.)	Date of Manufacture	Date of Installation	Design Capacity (Bhp/rpm)
E1	Caterpillar C9 ACERT 194 kW (260 hp)	2015	2016	260 / 1,600

Reciprocating Internal Combustion Engines (R.I.C.E.) Information

Emission Unit ID No.	Subject to 40CFR60 Subpart IIII?	Subject to 40CFR60 Subpart JJJJ?	Subject to Sections 9.1.4/9.2.1 (Catalytic Reduction Device)
E1	Yes	No	No

Storage Tanks

Source ID No.	Status	Content	Design Capacity			Orientation	G40-C Applicable Section(s)
			Volume	Diameter	Throughput		
T1	Existing	Diesel	1,000 gal	4'	8,000 gal/yr	Horizontal	9

DESCRIPTION OF FUGITIVE EMISSIONS (taken directly from the application)

Potential sources of fugitive particulate emissions for this facility include emissions, which are not captured by pollution control equipment and emissions from open stockpiles and vehicular traffic on unpaved haulroads and work areas. The haulroads and work areas will be controlled by water truck in accordance with section E.6.c.i. of the General Permit. The stockpiles areas will be controlled by water truck with pressurized pumps sufficient to control emissions. The water truck will be operated three times daily, and more as needed in dry periods.

An additive to prevent freezing will be utilized in the winter months when freezing conditions are present. New course rock base material will be added to unpaved haulroads as needed.

SITE INSPECTION

A site inspection was not deemed to be necessary at this time due to the size, nature and proposed location of this rock crushing and screening plant. The plant will be located near an active surface mine located in a remote area of Logan County, WV. The facility will be inspected by the DAQ's Compliance and Enforcement Section on a set schedule after it is constructed.

Directions to the facility from Charleston are to take US-119 S and travel 27.5 miles, turn right onto Smoot Avenue and travel 1.7 miles, Smoot Avenue becomes WV-17 and travel 21.2 miles, turn left onto County Highway-15/Kelly Hollow Road and continue to follow County Highway-15 for 8.1 miles, turn right onto Kelly Mount Rum Creek Road and travel 0.1 miles, stay straight to go onto County Highway-14/Kelly Mount Rum Creek Road and travel 2.4 miles, turn left onto Buffalo Creek Road/County Highway-16 and travel approximately 7 miles passing Lorado, WV and to Pardee, WV, turn left onto CR-16/3 and travel 0.1 miles and then turn left onto Meredith Branch Road and travel the road to the top of the hill to the entrance of the surface mine and proceed to the guard shack.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

The Powerscreen Premiertrak 400 Jaw Crusher will be powered by a Caterpillar C9 ACERT 194 kW (260 hp) at 1,600 rpm engine manufactured in 2015 and labeled E1. Engine E1 is a 6 cylinder direct injection engine and is EU Stage IIIA/US Tier 3 certified according to the manufacturer's information included in the application. Engine E1 shall not exceed 1,600 hours of operation per year.

The applicant's consultant used emission factors from AP-42 5th Edition Section 3.3 Gasoline and Diesel Industrial Engines (10/96) - Table 3.3-1 for Diesel Fuel to calculate the emissions from engine E1. However, these emission factors have not been updated since 1996 and overestimate the potential emissions from newer engines such as engine E1, and thus they do not meet the EPA's Exhaust Emission Standards for certified engines. The writer could not find an

exact match for engine E1 with the information provided on EPA's Engine Certification Data page found at <https://www.epa.gov/compliance-and-fuel-economy-data/engine-certification-data#large> for the years 2006-2010, 2011-2013 or 2014-15. Therefore, the writer performed the emission calculations for engine E1 based on the manufacturer's information that states that the engine is 194 kW (260 hp) and a EU Stage IIIA / US Tier 3 certified engine. A copy of the calculations spreadsheet has been attached.

Maximum permitted emissions from Greenbrier Minerals, LLC's diesel fired engine E1 are summarized in the table below. The application limits engine E1 to 1,600 hours per year of operation.

Criteria Pollutants	Emission Factors	Maximum Hourly Emissions (lb/hr)	Maximum Annual Emissions (TPY)
NO _x	2.98 g/kW-hr ¹	1.28	1.02
CO	3.50 g/kW-hr ¹	1.50	1.20
VOC	1.02 g/kW-hr ¹	0.43	0.38
SO ₂	0.00205 lb/hp-hr ²	0.53	0.43
PM ₁₀	0.02 g/kW-hr ¹	0.09	0.07
Total HAP	various ³	0.0077	0.0062

¹ Emission factors for NO_x, CO, VOC and PM₁₀ were taken from EPA's Exhaust Emission Standards for certified engines for a 194 kW (260 hp) Tier 3 engine.

² The emission factor for SO₂ was taken from AP 42, Fifth Edition, Volume I, Chapter 3.3 Gasoline and Diesel Industrial Engines (10/96), Table 3.3-1 Emission Factors for Uncontrolled Gasoline and Diesel Industrial Engines. The emission factor for SO_x was used for SO₂ because it is the only emission factor available and will be a conservative estimate since SO₂ will be a portion of SO_x.

³ Emission factors for the various HAPs were taken from Table 3.3-2. Speciated Organic Compound Emission Factors for Uncontrolled Diesel Engines.

Total HAP's calculated for diesel fired engine E1 are 0.0077 lb/hr and 0.0062 TPY and summarized in the following table.

Hazardous Air Pollutants	Emission Factor ¹ (lb/MMBtu)	Maximum Hourly Emissions (lb/hr)	Maximum Annual Emissions (TPY)
Benzene	0.000933	0.00113	0.000906
Toluene	0.000409	0.00050	0.000397
Xylenes	0.000285	0.00035	0.000277
Propylene	0.00258	0.00323	0.002506
1,3-Butadiene	0.0000391	0.000047	0.000038
Formaldehyde	0.00118	0.00143	0.001146
Acetaldehyde	0.000767	0.00093	0.000745
Acrolein	0.0000925	0.00011	0.0000898
Naphthalene	0.0000848	0.00010	0.0000824
Total HAP's		0.0077	0.0062

¹ Emission factors were taken from AP 42, Fifth Edition, Volume I, Chapter 3.3 Gasoline and Diesel Industrial Engines (10/96), Table

Fugitive emission calculations for continuous and batch drop operations, transfer points, crushing and screening, storage piles, and paved and unpaved haulroads are based on AP-42 Fifth Edition "Compilation of Air Pollution Emission Factors", Volume 1. Control efficiencies were applied based on "Calculation of Particulate Matter Emission - Coal Preparation Plants and Material Handling Operations." The emission factors for crushing/breaking and screening operations were obtained from the Air Pollution Engineering Manual - Air & Waste Management Association - June 1992. The calculations were performed by the applicant's consultant using the DAQ's G40-C Excel Emission Calculation Spreadsheet and were checked for accuracy and completeness by the writer.

The proposed construction will result in a potential to discharge controlled particulate matter emissions of 60.23 pounds per hour (PPH) and 48.31 tons per year (TPY) of particulate matter (PM), of which 13.45 PPH and 10.81 TPY will be particulate matter less than 10 microns in diameter (PM₁₀). Refer to the following table for a complete summary of the proposed facility's potential to discharge:

- Proposed Plant Emissions - Greenbrier Minerals, LLC G40-C082 -Rock Crushing/Screening	Controlled PM Emissions		Controlled PM₁₀ Emissions	
	lb/hour	TPY	lb/hour	TPY
Fugitive Emissions				
Open Storage Pile Emissions	0.04	0.16	0.02	0.08
Unpaved Haulroad Emissions	57.51	46.01	12.10	9.68
Paved Haulroad Emissions	0.00	0.00	0.00	0.00
<i>Fugitive Emissions Total</i>	<i>57.54</i>	<i>46.17</i>	<i>12.12</i>	<i>9.76</i>
Point Source Emissions				
Crushing/Screening Emissions	2.58	2.06	1.23	0.98
Transfer Point Emissions	0.02	0.01	0.01	0.01
Engine E1	0.09	0.07	0.09	0.07
<i>Point Source Emissions Total (PTE)</i>	<i>2.69</i>	<i>2.14</i>	<i>1.33</i>	<i>1.06</i>
FACILITY-WIDE EMISSIONS	60.23	48.31	13.45	10.81

Greenbrier Minerals, LLC's proposed rock crushing and screening plant (G40-C082), existing emergency generator (G60-C079) and existing raw coal crushing plant (G10-D164) are located on the same property and will share a common facility ID number of 045-00149. The proposed rock crushing and screening plant is considered a support facility for the existing raw coal crushing plant since the rock that is being crushed will be used in maintaining the haulroads used to transport the raw coal from the surface mine.

A summary of the calculated emissions for Greenbrier Minerals, LLC's existing raw coal crushing plant (G10-D164) are shown in the following table:

- Existing Plant Emissions - Greenbrier Minerals, LLC G10-D164 - Coal Screening Plant	Controlled PM Emissions		Controlled PM₁₀ Emissions	
	lb/hour	TPY	lb/hour	TPY
Fugitive Emissions				
Open Storage Pile Emissions	0.04	0.19	0.02	0.09
Unpaved Haulroad Emissions	108.14	474.84	31.25	137.23
Paved Haulroad Emissions	0.00	0.00	0.00	0.00
<i>Fugitive Emissions Total</i>	<i>108.18</i>	<i>475.02</i>	<i>31.27</i>	<i>137.32</i>
Point Source Emissions				
Crushing/Screening Emissions	12.00	52.56	5.64	24.70
Transfer Point Emissions	4.51	19.77	2.14	9.35
Engine E1	0.24	0.06	0.24	0.06
<i>Point Source Emissions Total (PTE)</i>	<i>16.75</i>	<i>72.39</i>	<i>8.02</i>	<i>34.12</i>
FACILITY EMISSIONS TOTAL				
	124.94	547.42	39.29	171.43

A summary of the calculated emissions for Greenbrier Minerals, LLC's existing emergency generator (G60-D079) are shown in the following table:

Hourly and Annual Emission Calculations for Greenbrier Minerals, LLC's Emergency Generator Gen Set-1 (2007 Caterpillar 3512B)						
Pollutant	Emission Factor			Engine Emissions		
	Factor	Units	Source	lb/hr	Limited ⁽¹⁾ TPY	Max. ⁽²⁾ TPY
NO _x	5.32	g/kW-hr	2007 EPA Tier 2 Exhaust Emission Compliance Statement ⁽⁴⁾	17.52	4.38	76.72
CO	1.61	g/kW-hr		5.30	1.33	23.22
VOC	0.000705	lb/hp-hr	AP-42 Table 3.4-1	1.41	0.35	6.18
PM	0.136	g/kW-hr	2007 EPA Tier 2 Exhaust Emission Compliance Statement ⁽⁴⁾	0.45	0.11	1.96
SO _x	0.00001 ⁽⁵⁾	lb/hp-hr	AP-42 Table 3.4-1	0.02	< 0.01	0.11
Total HAPs ⁽³⁾	various	lb/MM Btu	AP-42, Table 3.4-3	0.06	0.02	0.27
<p>(1) Based on operating the generator 500 hr/yr.</p> <p>(2) Based on operating the generator 8,760 hr/yr.</p> <p>(3) Greenbrier Minerals, LLC used a diesel fuel consumption rate of 108.6 gal/hr and a fuel Btu value of 136,600 Btu/gal.</p> <p>(4) The engine is EPA Tier 2 certified: EPA Certificate Number - CPX-NRCI-07-13; EPA Engine Family - 7CPXL58.6T2E.</p> <p>(5) Where SO_x = 0.00809 * S₁ where S₁ equals the % sulfur in fuel oil (15 ppm)</p>						

Greenbrier Minerals, LLC's proposed rock crushing and screening plant (G40-C082), existing emergency generator (G60-C079) and existing raw coal screening plant (G10-D164) meet the definition of "Building, Structure, Facility, or Installation" in 45CSR14.2.10 and "Major Source" in 45CSR30.2.26 and shall be considered as one facility for determining applicability to 45CSR14 (PSD) and 45CSR30 (Title V). Therefore, Greenbrier Minerals, LLC's proposed rock crushing and screening plant, existing emergency generator and existing raw coal screening plant shall be combined when determining applicability and share the common facility ID Number of 045-00149.

The proposed rock crushing and screening plant (G40-C082), existing emergency generator (G60-C079) and existing raw coal screening plant (G10-D164) will have a combined estimated potential to discharge controlled emissions of 595.83 TPY of particulate matter (PM), of which 182.37 TPY will be particulate matter less than 10 microns in diameter (PM₁₀). The proposed rock crushing and screening plant, existing emergency generator and existing raw coal screening plant will have a combined estimated potential to emit (coal open storage piles constructed or modified after May 27, 2009 and point sources combined) of 74.83 TPY of PM, of which 35.38 TPY will be PM₁₀. Refer to the following table for a complete summary of Greenbrier Minerals, LLC's proposed rock crushing and screening plant, existing emergency generator and existing raw coal screening plant's combined potential to discharge:

- Combined Emissions Totals - Greenbrier Minerals, LLC	Controlled PM Emissions		Controlled PM₁₀ Emissions	
	lb/hour	TPY	lb/hour	TPY
Fugitive Emissions				
G40-C082 - Rock Crushing/Screening	57.54	46.17	12.12	9.76
G60-C079 - Emergency Generator	0.00	0.00	0.00	0.00
G10-D164 - Raw Coal Screening Plant	108.18	475.02	31.27	137.32
<i>Fugitive Emissions Total</i>	<i>165.72</i>	<i>521.19</i>	<i>43.39</i>	<i>147.08</i>
Point Source Emissions				
G40-C082 - Rock Crushing/Screening	2.69	2.14	1.33	1.06
G60-C079 - Emergency Generator	0.45	0.11	0.45	0.11
G10-D164 - Raw Coal Screening Plant	16.75	72.39	8.02	34.12
<i>Point Source Emissions Total</i>	<i>19.89</i>	<i>74.64</i>	<i>9.80</i>	<i>35.29</i>
COMBINED EMISSIONS TOTAL	185.61	595.83	53.19	182.37

The maximum permitted emission rates for Engine E-1 (G40-C082), Gen Set-1 (G60-C079) and Engine E1 (G10-D164) shall not exceed the following based on a maximum of 500 hours of operation per year:

Pollutant	Engine E1 - G40-C082		Gen Set-1 - G60-C079		Engine E1 - G10-D164		Combined Emissions	
	Hourly Emissions lb/hour	Annual Emissions TPY	Hourly Emissions lb/hour	Annual Emissions TPY	Hourly Emissions lb/hour	Annual Emissions TPY	Hourly Emissions lb/hour	Annual Emissions TPY
NO _x	17.52	4.38	17.52	4.38	3.44	0.86	38.48	9.62
CO	5.30	1.33	5.30	1.33	0.74	0.19	11.34	2.85
VOC	1.41	0.35	1.41	0.35	0.27	0.07	3.09	0.77
SO ₂	0.02	< 0.01	0.02	0.01	0.23	0.06	0.27	0.07
PM ₁₀	0.45	0.11	0.45	0.11	0.24	0.06	1.14	0.28
Total HAP	0.06	0.02	0.06	0.02	0.01	< 0.01	0.13	0.04

REGULATORY APPLICABILITY

NESHAPS and PSD have no applicability to the proposed facility. The proposed construction of Greenbrier Minerals, LLC's rock crushing and screening plant is subject to the following state and federal rules:

45CSR7 To Prevent and Control Particulate Matter Air Pollution From Manufacturing Processes and Associated Operations

The facility is subject to the requirements of 45CSR7 because it meets the definition of "Manufacturing Process" found in subsection 45CSR7.2.20. The facility should be in compliance with Subsection 3.1 (no greater than 20% opacity), Subsection 3.7 (no visible emissions from any storage structure pursuant to subsection 5.1 which is required to have a full enclosure and be equipped with a control device), Subsection 4.1 (PM emissions shall not exceed those allowed under Table 45-7A), Subsection 5.1 (manufacturing process and storage structures must be equipped with a system to minimize emissions), Subsection 5.2 (minimize PM emissions from haulroads and plant premises) when the particulate matter control methods and devices proposed are in operation.

According to Table 45-7B, for a type 'a' source with a maximum process weight rate of 800,000 lb/hour (400 TPH), the maximum allowable emission rate is 50 lb/hour of particulate matter (PM). The calculated maximum controlled emission rate for point sources is 2.14 lb/hour of particulate matter (PM).

45CSR13 Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Temporary Permits, General Permits, and Procedures for Evaluation

The proposed construction is subject to the requirements of 45CSR13 because it will result in a potential to discharge greater than six pounds per hour and ten tons per year for a regulated pollutant (PM and PM₁₀), involve the construction of equipment which are defined as affected facilities and subject to 40 CFR 60 NSPS Subpart OOO revised on April 22, 2008 and involve the construction of an engine which is subject to 40 CFR 60 Subpart IIII. The

applicant has submitted an application for a General Permit registration to construct. The applicant published a Class I legal advertisement in the *Logan Banner* on November 4, 2016 and submitted \$500 for the General Permit application fee and \$1,000 for the NSPS fee.

45CSR16 Standards of Performance for New Stationary Sources
40 CFR 60 Subpart OOO: Standards of Performance for Nonmetallic Mineral Processing Plants

The proposed construction is subject to 40 CFR 60 Subpart OOO because it will occur after April 22, 2008 and it is a portable plant that will process more than 150 tons of rock per hour. The proposed construction will include one (1) bin, one (1) crusher, one (1) screen, five (5) belt conveyors and three (3) open storage piles, which are defined as affected facilities within 40 CFR 60 Subpart OOO. Therefore, the proposed construction is subject to 45CSR16, which incorporates by reference 40 CFR 60 Subpart OOO - Standards of Performance for Nonmetallic Mineral Processing Plants. The facility should be in compliance with 60.672 (b) no greater than 7% opacity from any screen and transfer points on belt conveyors or from any other affected facility (as defined in 60.670 and 60.671) and no greater than 12% opacity from any crusher when the particulate matter control methods and devices proposed are in operation.

45CSR30 Requirements for Operating Permits

In accordance with 45CSR30 Major Source Determination, the proposed rock crushing and screening plant will be a non-major source which is subject to NSPS Subpart OOO. The facility-wide *combined* potential to emit (coal open storage piles constructed or modified after May 27, 2009 and point sources combined) for the proposed rock crushing and screening plant, existing emergency generator and existing raw coal crushing plant will be 35.38 TPY of a regulated air pollutant (PM₁₀), not including fugitive emissions from haulroads, which is less than the 45CSR30 threshold of 100 TPY of a regulated air pollutant used to define a major stationary source. Therefore, the facility will be subject to 45CSR30 and classified as a Title V deferred non-major source.

45CSR16 Standards of Performance for New Stationary Sources
40 CFR 60 Subpart IIII: Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

The provisions of Subpart IIII are applicable to owners and operators of stationary compression ignition (CI) internal combustion engines (ICE) which are manufactured after April 1, 2006, are not fire pump engines and commence construction after July 11, 2005. For the purposes of Subpart IIII, the date that construction commences is the date the engine is ordered by the owner or operator.

Engine E1 is a Caterpillar C9 ACERT 194 kW (260 hp) at 1,600 rpm engine manufactured in 2015 and labeled E1. Engine E1 is a 6 cylinder direct injection engine and is EU Stage IIIA/US Tier 3 certified. In accordance with § 60.4200 (2), this engine is subject to Subpart

III because it was manufactured after April 1, 2006 and commenced construction after July 11, 2005.

In accordance with § 60.4207(b), “Beginning October 1, 2010, owners and operators of stationary CI ICE subject to this subpart with a displacement of less than 30 liters per cylinder that use diesel fuel must use diesel fuel that meets the requirements of 40 CFR 80.510(b) for nonroad diesel fuel.”

40 CFR 89 Control of Emissions From New and In-use Nonroad Compression-Ignition Engines

This part applies to all compression-ignition nonroad engines except those specified in paragraph (b) of this section. This means that the engines for which this part applies include but are not limited to compression-ignition engines exempted from the requirements of 40 CFR Part 92 by 40 CFR 92.207 or 40 CFR Part 94 by 40 CFR 94.907. This part applies as specified in 40 CFR part 60 subpart III, to compression-ignition engines subject to the standards of 40 CFR part 60, subpart III.

The proposed construction of Greenbrier Minerals, LLC’s rock crushing and screening plant is not subject to the following state and federal rules:

45CSR14 Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution for the Prevention of Significant Deterioration

In accordance with 45CSR14 Major Source Determination, the proposed rock crushing and screening plant is not listed in Table 1 Source Categories Which Must Include Fugitive Emissions. The facility-wide *combined* potential to emit (coal open storage piles constructed or modified after May 27, 2009 and point sources combined) for the proposed rock crushing and screening plant, existing emergency generator and existing raw coal crushing plant will be 74.83 TPY of a regulated air pollutant (PM), not including fugitive emissions, which is less than the 45CSR14 threshold of 250 TPY for a regulated air pollutant used to define a major stationary source. Therefore, the proposed construction is not subject to the requirements set forth within 45CSR14.

40 CFR 60 Subpart Kb—Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984

Pursuant to §60.110b, 40 CFR 60, Subpart Kb applies to “each storage vessel with a capacity greater than or equal to 75 cubic meters (m³) that is used to store volatile organic liquids (VOL) for which construction, reconstruction, or modification is commenced after July 23, 1984.” The proposed diesel storage tank T1 to be located at the facility will be 1,000 gallons (approximately 3.79 m³). Therefore, Subpart Kb does not apply to the proposed storage tank.

40 CFR 63 Subpart ZZZZ: National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

According to the RICE NESHAP Summary of Requirements, new and reconstructed stationary non-emergency compression ignition engine constructed on or after June 12, 2006 and located at an area source of HAP are subject to 40 CFR part 60, subpart IIII (Standards of Performance for Stationary Compression Ignition Internal Combustion Engines).

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

A toxicity analysis was not performed because the primary pollutants that will be emitted from this facility are PM (particulate matter) and PM₁₀ (particulate matter less than 10 microns in diameter), which are non-toxic pollutants. The only non criteria regulated pollutants that are addressed by this permit application are the very small amount of Hazardous Air Pollutants that are the normal byproduct of diesel combustion. The majority of non-criteria regulated pollutants fall under the definition of HAPs which, with some revision since, were 188 compounds identified under Section 112(b) of the Clean Air Act (CAA) as pollutants or groups of pollutants that EPA knows or suspects may cause cancer or other serious human health effects. The following lists includes each HAP's carcinogenic risk (as based on analysis provided in the Integrated Risk Information System (IRIS)):

Acetaldehyde:

Acetaldehyde is mainly used as an intermediate in the synthesis of other chemicals. It is ubiquitous in the environment and may be formed in the body from the breakdown of ethanol. Acute (short-term) exposure to acetaldehyde results in effects including irritation of the eyes, skin, and respiratory tract. Symptoms of chronic (long-term) intoxication of acetaldehyde resemble those of alcoholism. Acetaldehyde is considered a probable human carcinogen (Group B2) based on inadequate human cancer studies and animal studies that have shown nasal tumors in rats and laryngeal tumors in hamsters.

Acrolein:

Acrolein is primarily used as an intermediate in the synthesis of acrylic acid and as a biocide. It may be formed from the breakdown of certain pollutants in outdoor air or from the burning of organic matter including tobacco, or fuels such as gasoline or oil. It is toxic to humans following inhalation, oral or dermal exposures. Acute (short-term) inhalation exposure may result in upper respiratory tract irritation and congestion. No information is available on its reproductive, developmental, or carcinogenic effects in humans, and the existing animal cancer data are considered inadequate to make a determination that acrolein is carcinogenic to humans.

Benzene:

Benzene is found in the air from emissions from burning coal and oil, gasoline service stations, and motor vehicle exhaust. Acute (short-term) inhalation exposure of humans to benzene may cause drowsiness, dizziness, headaches, as well as eye, skin, and respiratory tract irritation, and, at high levels, unconsciousness. Chronic (long-term) inhalation exposure has caused various disorders in the blood, including reduced numbers of red blood cells and aplastic anemia, in occupational settings. Reproductive effects have been reported for women exposed by inhalation to high levels,

and adverse effects on the developing fetus have been observed in animal tests. Increased incidence of leukemia (cancer of the tissues that form white blood cells) have been observed in humans occupationally exposed to benzene. EPA has classified benzene as a Group A, human carcinogen.

Formaldehyde:

Formaldehyde is used mainly to produce resins used in particle board products and as an intermediate in the synthesis of other chemicals. Exposure to formaldehyde may occur by breathing contaminated indoor air, tobacco smoke, or ambient urban air. Acute (short-term) and chronic (long-term) inhalation exposure to formaldehyde in humans can result in respiratory symptoms, and eye, nose, and throat irritation. Limited human studies have reported an association between formaldehyde exposure and lung and nasopharyngeal cancer. Animal inhalation studies have reported an increased incidence of nasal squamous cell cancer. EPA considers formaldehyde a probable human carcinogen (Group B1).

Naphthalene:

Naphthalene is used in the production of phthalic anhydride; it is also used in mothballs. Acute (short-term) exposure of humans to naphthalene by inhalation, ingestion, and dermal contact is associated with hemolytic anemia, damage to the liver, and neurological damage. Cataracts have also been reported in workers acutely exposed to naphthalene by inhalation and ingestion. Chronic (long-term) exposure of workers and rodents to naphthalene has been reported to cause cataracts and damage to the retina. Hemolytic anemia has been reported in infants born to mothers who "sniffed" and ingested naphthalene (as mothballs) during pregnancy. Available data are inadequate to establish a causal relationship between exposure to naphthalene and cancer in humans. EPA has classified naphthalene as a Group C, possible human carcinogen.

Toluene:

The acute toxicity of toluene is low. Toluene may cause eye, skin, and respiratory tract irritation. Short-term exposure to high concentrations of toluene (e.g., 600 ppm) may produce fatigue, dizziness, headaches, loss of coordination, nausea, and stupor; 10,000 ppm may cause death from respiratory failure. Ingestion of toluene may cause nausea and vomiting and central nervous system depression. Contact of liquid toluene with the eyes causes temporary irritation. Toluene is a skin irritant and may cause redness and pain when trapped beneath clothing or shoes; prolonged or repeated contact with toluene may result in dry and cracked skin. Because of its odor and irritant effects, toluene is regarded as having good warning properties. The chronic effects of exposure to toluene are much less severe than those of benzene. No carcinogenic effects were reported in animal studies. Equivocal results were obtained in studies to determine developmental effects in animals. Toluene was not observed to be mutagenic in standard studies.

Xylene:

Commercial or mixed xylene usually contains about 40-65% m-xylene and up to 20% each of o-xylene and p-xylene and ethyl benzene. Xylenes are released into the atmosphere as fugitive emissions from industrial sources, from auto exhaust, and through volatilization from their use as solvents. Acute (short-term) inhalation exposure to mixed xylenes in humans results in irritation of the eyes, nose, and throat, gastrointestinal effects, eye irritation, and neurological effects. Chronic (long-term) inhalation exposure of humans to mixed xylenes results primarily in central nervous

system (CNS) effects, such as headache, dizziness, fatigue, tremors, and incoordination; respiratory, cardiovascular, and kidney effects have also been reported. EPA has classified mixed xylenes as a Group D, not classifiable as to human carcinogenicity.

All HAPs have other non-carcinogenic chronic and acute effects. These adverse health affects may be associated with a wide range of ambient concentrations and exposure times and are influenced by source-specific characteristics such as emission rates and local meteorological conditions. Health impacts are also dependent on multiple factors that affect variability in humans such as genetics, age, health status (e.g., the presence of pre-existing disease) and lifestyle. *There are no federal or state ambient air quality standards for these specific chemicals.* For a complete discussion of the known health effects of each compound refer to the IRIS database located at www.epa.gov/iris.

AIR QUALITY IMPACT ANALYSIS

Air dispersion modeling was not performed due to the size and location of this proposed facility. This facility will be located in Logan County, WV, which is currently in attainment for PM (particulate matter) and PM₁₀ (particulate matter less than 10 microns in diameter). This proposed facility will be a minor source as defined by 45CSR14, therefore, an air quality impact analysis is not required.

GENERAL PERMIT ELIGIBILITY

The proposed construction of this facility meets the applicability criteria (Section 2.3), siting criteria (Section 3.1) and limitations and standards (Section 5.1) as specified in General Permit G40-C.

All registered facilities under Class II General Permit G40-C are subject to Sections 1.0, 1.1, 2.0, 3.0 and 4.0.

MONITORING OF OPERATIONS

The rock processing and conveying equipment and storage areas should be observed to make sure that the facility is meeting the applicable visible emission standards of 40 CFR 60, Subpart OOO. For affected facilities constructed, re-constructed or modified after April 22, 2008, visible emissions from any screen, transfer point on a belt conveyor, storage bin or from any other affected facility shall not exceed seven percent (7%) opacity and any crusher shall not exceed twelve percent (12%) opacity as referenced in 40 CFR 60.272(b).

RECOMMENDATION TO DIRECTOR

The information contained in this registration application to construct indicates that compliance with all applicable regulations should be achieved when all of the proposed particulate matter control methods are in operation. Due to the location, nature of the process, and control methods proposed, adverse impacts on the surrounding area should be minimized. No comments were received during the comment period. Therefore, the granting of a General Permit G40-C registration to Greenbrier Minerals, LLC for the construction of a rock crushing and screening plant to be located near Lorado, Logan County, WV is hereby recommended.



Daniel P. Roberts, Engineer Trainee
NSR Permitting Section

April 21, 2017

Date

Engine E1: Caterpillar C9 Acert 6 cylinder

Tier 3

260 hp
194 kW
9 gallons/hour
14400 gallons/year

Diesel Fuel 136600 BTU/gallon
Max Heat 1.2294 MMBtu/hr
1600 hours/year
453 grams/lb

8,760 hr/year

	Source	g/kW-hr	lb/hp-hr	lb/hour	TPY	TPY
NOx	Standard	2.98		1.2771	1.0217	5.5938671
NMHC (VOC)	Standard	1.02		0.4348	0.3479	1.9046143
CO	Standard	3.50		1.498	1.1984	6.5611712
PM	Standard	0.20		0.0856	0.0685	0.3749241
SOx	AP42		0.00205	0.533	0.4264	2.33454
AP42 Table 3.3-1 for Diesel Fuel						

From EPA Compression-Ignition Engines: Exhaust Emissions Standards table dated March 201 for a 130 to 225 kW Tier 3 engine, NMHC+NOx emission factor is 4.0 g/kW-hr

NMHC+NOx = 4.00 g/kw-hr
 NOx= NMHC+NOx x 74.6% = 2.984 g/kw-hr
 NMHC (VOC)= NMHC+Nox x 25.4% = 1.016 g/kw-hr

HAZARDOUS AIR POLLUTANTS

AP-42 5th Edition Section 3.3 Gasoline and Diesel Industrial Engines (10/96) - Table 3.3-2
45CSR30 Table 45-30A Hazardous Air Pollutants Less than 600 hp

Caterpillar C9 Diesel Fuel Engine	260	hp		
Maximum Hours of Operation	1600	hours/year		
Maximum diesel usage at 1600 rpm	9	gal/hour		
Heating Value for diesel	134900	BTU/US gal		
Emission Factor (lb/hp-hr)	0.000933			
Emission Factor (lb/MMBtu)	0.000409			
Emission Factor (lb/gal)	7.1			
Emission Factor (lb/ton)	19300			

E (hourly) = Emission Factor (lb/hp-hr) * Horse Power (hp)

E (annual) = Emission Factor (lb/hp-hr) * Horse Power (hp) * Maximum Hours of Operation * 1 ton
per 2000 lb

CAS NO.		Emission Factor (lb/MMBtu)	Rating	lb/hour	TPY	TPY
71-43-2	Benzene	0.000933	E	0.0011	0.000906	0.00496
108-88-3	Toluene	0.000409	E	0.0005	0.000397	0.00217
	Xylenes	0.000285	E	0.0003	0.000277	0.00152
	Propylene	0.00258	E	0.0031	0.002506	0.01372
	1,3-Butadiene	0.0000391	E	5E-05	3.8E-05	0.00021
50-00-0	Formaldehyde	0.00118	E	0.0014	0.001146	0.00627
	Acetaldehyde	0.000767	E	0.0009	0.000745	0.00408
	Acrolein	0.0000925	E	0.0001	8.98E-05	0.00049
91-20-3	Naphthalene	0.0000848	E	0.0001	8.24E-05	0.00045
Burning diesel fuel:			Total HAPs	0.0077 lb/hour	0.006187 TPY	0.03388 TPY